Marketing Strategies of Multinational Chemical Companies In Emerging Markets With Special Reference To Polyurethane Industry In India

Revised Synopsis
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Section I: Introduction to The Chemical Industry in India

The chemicals sector holds a significant position in the Indian economy, accounting for 7% of the GDP and about 14% in overall index of industrial production (IIP). India has significant presence in production of basic organic chemicals, fertilisers, pesticides, paints, dyestuffs and intermediates and fine and specialty chemicals. The sector faces key challenges such as inadequate infrastructure facilities, high costs of basic raw materials like natural gas and crude oil, high cost of capital and need for technological modernization of its facilities. **(PricewaterhouseCoopers, 2016)**

The Indian Chemical Industry stood at 147 Billion USD in 2015 and is expected grow at an average rate of 9% CAGR, to reach 220 billion USD by 2020 , driven by sustainable growth drivers and government initiatives . With more than 80,000 products for downstream industries like automotive, textiles, pharmaceuticals, personal care, consumer durable, construction and engineering, food production and processing the Indian chemical industry is playing a critical role in enhancing the quality of life.

The key success factors for the sectors are the use of advanced technology, strong research capabilities, backward and forward linkages and development of domestic capacity to reduce dependence on imported raw materials. It has also become imperative for the sector to address safety, health and environmental protection issues in an organized manner

Indian Chemical industry has moved quite ahead, since liberalization of economy and many leading Multinational companies have direct presence in India with elaborate set up, complete with manufacturing and distribution capabilities.

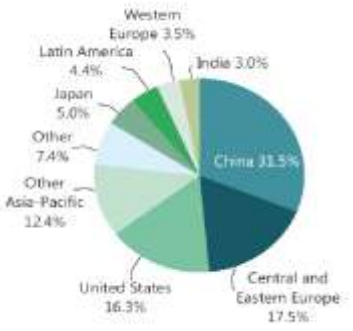
The Chemical Industry is a capital as well as knowledge intensive industry. the industry plays significant role in global economic and social deployment. It is also human resource intensive industry and generates significant employment. Globally, the industry employs more than 20 million people, Globally chemical industry was estimated at 3.9 Trillion USD in 2013 and is expected to grow at 4-5% CAGR to reach USD 5.2-5.5 trillion by 2020

1.1. Size & Characteristics

Global chemical market size was estimated at 3.9 trillion in 2013 and is expected to grow at 5-6% per annum over the next decade to reach ~5.1 trillion by 2018. Despite its large size and significant GDP contribution Indian chemical industry currently accounts only for ~3% of the world's chemical market. Geographical breakdown of global chemical shipments in the year 2013 is as under

Country/Region	Sales (US$ billion)
China	1228
United States (US)	635
Central & Eastern Europe	682
Japan	211
Latin America	172
Western Europe	136
India	118
Other Asia-Pacific	484
Others	233

Source: Cefic Report 2013, Analysis by Tata Strategic



1.2. Current Scenario

Chemical and chemical products sector accounted for 2.11% of the GDP (at 2004 -05prices) in 2012-13 , compared to 2.06% in 2011-121. The share of this sector in the GDP for manufacturing sector at 2004 -05 prices was 15% during 2012-13.

The export of major chemicals & petro chemicals was 11,50,706 crore during 2012 -13. It contributed 9.2% of the total exports during 2012-13 and 2011-12. The import of major chemicals and petrochemicals was Rs. 2,02347 Crore during 2012-13.Its share in the total imports was 7.6%during 2012-13, compared to 7.2% during 2011-12. Net imports have grown ~20%between FY09 and FY 13.

The import-export scenario of chemical industry in india (in Rs. Crore)

Source: Chemicals & Petrochemical Statistics at a Glance: 2013

1.3. Industry Segments

Chemical Industry can be broadly classified into following sub Groups :

- **Bulk Chemicals:** It Includes chemicals (acetic acid etc.) and anise organic chemicals (caustic soda , chlor alkali etc.)
- **Specialty Chemicals:** Specialty Chemicals , also known as performance chemicals are low volume but high value compounds . These chemicals are derived from basic chemicals and are sold on the basis of what they do, rather than what they are.
- **Agro Chemicals:** Chemicals essentially meant to protect crop and agriculture against pests and insects are covered in this **group**

- **Petrochemicals:** These are products derived from petroleum, two most common classes are olifines (including ethylene and propylene) and aromatics (including benzene , toluene and xylene isomers)
- **Fertilizers: Fertilizer** is any organic or inorganic substance which supplies chemicals elements required for plant growth. Fertilizer sector manufactures critical raw materials for agriculture which is major occupation of the country**.**

Segments	Characteristics	Constituent industries
Basic	▪ High volume, low value-added ▪ Limited product differentiation across manufacturers ▪ High entry barriers on account of high capital spend and stringent regulations	▪ Petrochemicals ▪ Fertilisers ▪ Inorganic chemicals ▪ Other industrial chemicals
Speciality	▪ High product differentiation and value-addition ▪ Typically smaller production units with more flexibility ▪ Low capital investment levels	▪ Adhesive sealants ▪ Catalysts ▪ Industrial gases ▪ Plastic additives
Knowledge	▪ Differentiated chemical and biological substances used to induce specific outcomes in humans, animals, plants and other life forms ▪ High investments in R&D and marketing	▪ Agrochemicals ▪ Pharmaceuticals ▪ Biotechnology

1.4. Competitive Landscape

The Indian chemical industry is comprised of both small and large scale companies with about 65,000 – 70,000 small chemical manufactures across the country. The majority of these manufacturers are present in the bulk chemical segment.In bulk chemical segment, the products manufactured are de-licensed which negates the technology barrier. However, economy of scale is a critical variable to sustain in this thin margin business. This calls for high upfront capital investment which creates an entry barrier for smaller firms. As a result, there are only few large players in the basic chemical segment. Smaller manufacturers tend to focus on a small number of basic chemicals and mostly have only regional presence. In the specialty chemicals space the focus is mostly on technological prowess, R&D skills, employee skills, and strength of patents.

Presence of multiple entry barriers makes all the more daunting for companies to enter and succeed. A potential entrant to these two segments would need high spending power to invest in technology and R&D. It should also be capable to withstand the losses that might happen till a product reaches commercial scalability. Unlike the bulk segment, companies manufacturing specialty chemicals face higher risk of failure. In line with risks involved, the margins earned are correspondingly higher for the latter. Some of the major chemical manufacturers in India are - Tata Chemicals Ltd, UPL Ltd, India Glycols Ltd (IGL), BASF India and Phillips Carbon Ltd

India Brand Equity Foundation (IBEF, 2016)

Competitive Rivalry: Chemical industry is highly fragmented with intense rivalry amongst companies. Since, 100 per cent FDI is allow hence domestic companies face stiff competition from foreign competitors as well. International companies may also dump chemicals at low price.

- Threat of New Entrants: Huge capital requirements and patent protection are significant barriers • Other barriers include - R&D and personnel requirements

- Substitute Products: Buyers tend to have specific chemical requirements. There are no direct substitutes for a specific chemical requirement

- Bargaining Power of Suppliers: Small chemical companies rely on supplies from larger plants, or petrochemical units. Inputs for a chemical plant cannot be easily substituted

- Bargaining Power of Customers: Customers have multiple sources of supply. Chemical companies are **bound** by long-term contracts. Niche specialty chemicals have some pricing power

Threat of New Entrants (High)
Bargaining Power of Customers (Medium)
Competitive Rivalry (Medium)
Substitute Products (Low)
Bargaining Power of Suppliers (High)

1.5. Polyurethane Industry : Introduction

Global PU Industry

Polyurethanes (PU) are some of the most versatile polymers in existence today and are available in various forms, ranging from flexible or rigid foams to tough elastomers. This leads to their usage in a wide variety of consumer and industrial applications such as thermal insulation of buildings, refrigerators, household furniture, automotive seating, shoe soles, etc. PU can be broadly classified Foaming and Non-foaming applications. Rigid PU foams are used primarily as an insulation material in construction and refrigeration applications, whereas Flexible PU foams are used mainly as a cushioning material in

transportation, furniture, bedding, carpet underlay, and packaging. Thermosetting elastomers and thermoplastic elastomers are main types of PU elastomers, of which thermosetting hold the larger market share.

The Global Market

	2010	**2016**
PU Market	13,650 kilo MT	17,946 kilo MT
Revenue	US$33,033 million	US$55479.68 million

Region Wise -

Over 92% of the global polyurethane demand comes from North America, Asia-Pacific, and Europe. North America and Western Europe are mature markets and are expected to grow passively whereas Asia-Pacific, Eastern Europe and South America will be the regions to watch for PU boom in the coming decade. The clear front runner is the Asia-Pacific region with the healthy Chinese and Indian markets. Middle East has been witnessing robust growth over the past few years. Continued input in terms of investments in polyurethane production and support by way of encouraging regulations has largely contributed to market growth in the region.

Industry Wise

The furniture and interior industry dominates the polyurethane market closely followed by construction industry in the overall market scenario. Electronic appliances and automotives, however, are the fastest growing market for polyurethanes. Footwear, coatings, adhesives, sealants and elastomers are also other areas that have a wide spread use of PU raw materials.

Furniture/Bedding represents the largest end-use market for PU foams. An ageing health conscious population is driving significant changes in the bedding industry. Mattresses are categorized as innerspring, foam, water, and air-filled, among which foam mattresses are likely to witness a booming growth. PU foam plays a significant role in the construction of mattresses due to its effectiveness in relieving pressure points.

Polyurethanes are used in automotive interiors and exteriors extensively. In addition to the foam that makes car seats comfortable, bumpers, interior "headline" ceiling sections, the car body, spoilers, doors and windows all use polyurethanes. Polyurethane also enables manufacturers to provide drivers and passengers significantly more automobile "mileage" by reducing weight and increasing fuel economy, comfort, corrosion resistance, insulation and sound absorption.

Usage of PU in footwear provides high abrasion-resistance which are perfect for hardwearing shoe soles, with excellent long-term mechanical properties. Within the shoe sector, polyurethanes are found in a wide range of footwear types from sports and trekking boots to business and fashion shoe soles, without limiting design potential. In major appliances, rigid foams are used for refrigerator and freezer thermal insulation systems. Rigid polyurethane foam is an essential and cost-effective material that can be used for meeting required energy ratings in consumer refrigerators and freezers.

Polyurethane coatings can enhance a product's appearance and lengthen its lifespan. Polyurethane adhesives can provide strong bonding advantages, while polyurethane

sealants provide tighter seals. Polyurethane elastomers can be molded into almost any shape, are lighter than metal, offer superior stress recovery and can be resistant to many environmental factors.

Industry Challenges

The volatility in crude oil prices, causing fluctuating prices of MDI and TDI, has been a key factor hampering market growth. The global economic collapse reflected directly on the end-user markets of construction and automotive industries plunging the demand for polyurethane foams across the globe. This predicament shook the large manufacturers into minimizing capacity to reduce the blow and small manufacturers to shut down production units permanently.

Subdued consumer spending, slowdown in new housing starts, decline in automotive production, and increase in the volume of PU substitutes contributed to a significant decline in PU production. The much needed reprieve in the face of such adversities comes in the form of increasing concerns about energy conservation with the market expected to register growth. On the other hand, growth of end-use industries such as construction and electronics is expected to drive polyurethane demand in the next five years. The shift towards low-cost and long-lasting materials and rising significance of energy efficiency in appliances and buildings is expected to feed, grow and strengthen the PU market.

Key product innovations were introduced in order to tackle the declining demand for flexible polyurethane foam in the automotive, furniture and bedding industries:

Furniture/Bedding: The main impetus behind this decline is the decrease in furniture production due to lack of consumer demand and availability of other substitute materials. Factors such as the reduced cost of lower density foams, thinner mattresses, and customers requiring faster delivery times for mattresses than other furniture delivery (2 -5 days), have helped protect the industry from imports.

Transportation: As the automotive sector resounds with the calls for more economic and innovative vehicles, the PU foam supplied becomes more and more sophisticated. Polyurethane foam used in automotive seating has trended toward becoming thinner, while density is increasing, offering more cabin space above the seat and allowing the required amortization of vibration. The decline in molded seat foam is related to the general downtown in automotive production.

Global Players

Global polyurethane market is largely dominated by a handful of large companies in terms of production capacity. Competitive factors determining the player market presence include price, quality, and assortment of products and services.

The Ever-changing Industry

The industry continues to change with some mature markets and new ones opening up. Spray polyurethane foam continues to see an increase in demand in the residential and industrial applications. Renewable chemicals and energy efficiency are the topics of interest. Polyurethane also is being used for effective wound dressings, pharmaceutical delivery media, reliable drug delivery, comfortable mobility aids and hygienic hospital environments. Improving quality of life is redefining market evolution as well, such as new comfort levels in golf cart seating for the growing number of elderly.

Though purchasing new property and housing has slowed down considerably, expenditures on remodeling and repairs have increased. This development is largely responsible for the growing demand for spray polyurethane foam as internal wall insulation and the slower than expected decline in CASE products like elastomers used in thermal breaks in insulated windows, solar panels, wooden floor and turbine blade coatings, adhesives and sealants, and the steady demand for one component spray foams.

The primary reason for India witnessing a burst in opportunities in PU is the expanding middle class with increasing disposable incomes and rising urbanization supplemented strongly by investments in infrastructure.

PU Segment wise growth -

Segment	2005	**2010**	**2015**
SLABSTOCK	50000	83000	140000
FLXMOLDED	25000	54000	90000
RIGIDS	30000	65000	150000
SHOE SOLES	15000	53000	100000
CASE	8000	14000	25000
TPU	2000	3000	5000
Figures Volumes MT Source IPUA (IndianPolyuretahne Association)			

With Polyurethanes feeding into a wide spectrum of applications such as furniture & bedding, automotive, construction & building, footwear, appliances, CASE applications etc., a dip in one industry is suitably supported by a upswing in another.

The furniture industry in India is generating a turnover of 3500Crores per annum. The concept of good living and better lifestyle is catching up at all levels of society, where the middle class has also started to invest their money in most decorated furniture and comfort enhancing bedding. Flexible polyurethane foam is the most common cushioning material used in upholstered furniture. Foam has a variety of applications in upholstery. Some are functional, others are aesthetic.

The Indian automotive industry was among one of the fastest growing in the world. Between 1993 and 2002, average growth rates of 15% and 16% per annum were recorded for 4- and 2-wheelers respectively, and in 2004, the total 4- wheeler production exceeded 1 million units. Auto industry growth looks promising with several new OEM's setting shop in the country. India is also becoming active in exports mainly for small cars.

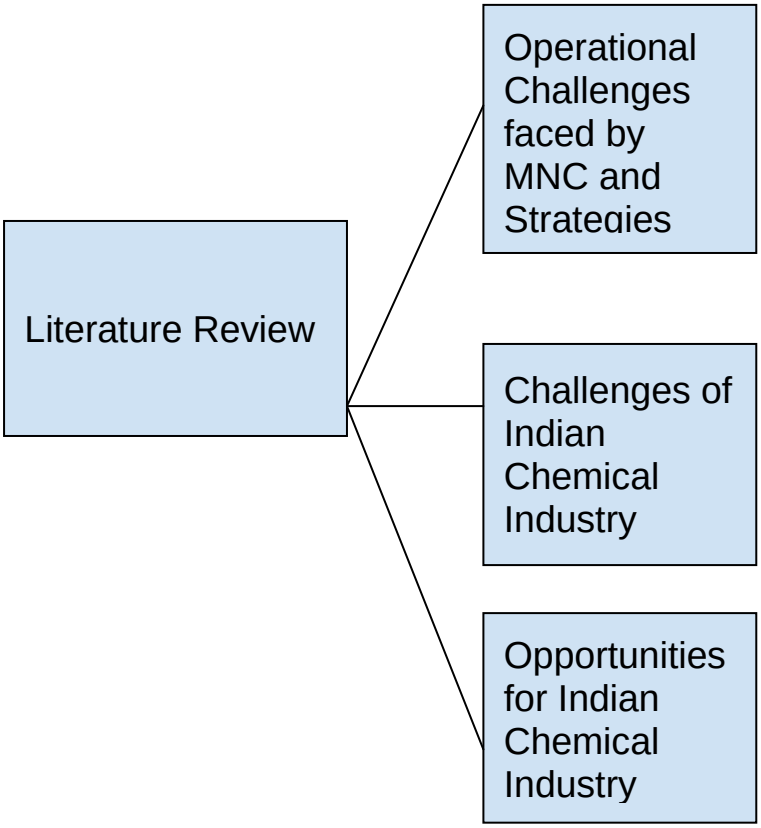
Application of PU in footwear industry has seen prominent growth in last few years with PU proving to be a worthy replacement to materials such as polyvinyl chloride (PVC) & ethylene vinyl acetate (EVA) because of ease of processing and designing.

Another key industry application of PU which is emerging to prominence in the last few years and one which industry experts believe will define the way forward is insulation, followed closely by furniture and bedding and CASE applications. As energy saving initiatives and sensitivity towards energy efficiency resonates across the country, PU as insulation material is being showcased intensely. Indian Polyurethane Association (IPUA) is also taking an active role in promoting the need of insulation in buildings through India Insulation Forum (IIF), which in turn will lead to rise in demand for PU.

Categorical efforts are in place to consolidate established applications and drive emerging applications of PU. As the manufacturers take stock of PU usage in domestic appliances, automotive, furniture, footwear and bedding, key areas such innovative footwear technologies, tailor-made solutions for automotive, retail and cold chain solutions for the emerging logistics sector and constructions solutions for infrastructure development will bring in the big bucks in the future.

Section II: Literature Review

2.1. Taxonomy of Literature Review


Literature Review
Operational Challenges faced by MNC and Strategies
Challenges of Indian Chemical Industry
Opportunities for Indian Chemical Industry

2.2. MNC Operations in growing economies

2.2.1. Currency Fluctuations

Articles in this category study the challenges faced by MNCs during currency fluctuations and different strategies employed by them during crisis. **Desai, Foley, and Forbes (2004)** studied the effects of financial constraints on firm growth. They found that U.S. multinational affiliates increase sales, assets and investment significantly more than local firms during, and subsequent to, currency crises and that the multinational parents also infuse new capital in their affiliates after currency crises. These results indicate a role for foreign direct investment in emerging markets – multinational affiliates expand economic activity during currency crises when local firms are most constrained.

Using a 20-year sample of 3788 firms from 23 countries (including some emerging markets), **Hutson and Stevenson (2010)** show that controlling for firm size, industry and several financial variables, firms in open economies is more exposed to exchange rate movements than firms in relatively closed economies.

Guglielmo et al. (2011) examined non-stationary panels of real exchange rates in a sample of 39 developing countries from Asia, MENA and Latin America. They found that international financial integration leads to long-run real exchange rate depreciation, and that misalignments reveal over-valuation in most Asian and Latin American countries and under-valuation in most MENA countries.

Work by **Udomkerdmongkol et al. (2009)** uses fixed and random effects to allow for countryspecific, time-invariant effects on annual data for 16 emerging market economies (including Chile, China, Colombia, Malaysia, Morocco, Pakistan, the Philippines, South Africa, Thailand and Venezuela) to study how actual exchange rates and exchange rate volatility impacts on inward FDI

2.2.2. Competition in growing economies

According to **Manrai, Manrai (2001)** in terms of the challenges, the limitations of infrastructure are a common concern shared by all emerging markets and so is the intense competition. In Asia–Pacific region, the markets are relatively more stable and there is a greater understanding of consumer behavior. However, perhaps the competition is even more intense in this region and local entrepreneurship is especially strong.

2.2.3. Growth in low income markets

Articles in this category study the conventions that MNCs follow to penetrate and profit in growing economies. **Bower and Sulej (2007)**analysed the strategies and trajectories of a number of Indian pharmaceutical companies that are expanding successfully in Western markets and assessed that Indian firms' growing revenues have been invested to develop regulatory and marketing expertise in Western markets, often through acquisitions and alliances, and also through hiring skilled returnees.

Dawar and Amitava (2002) concluded that MNCs, on the one hand, they seek billions of new consumers in the emerging markets —on the other, their marketing programs are scarcely adapted for these markets. The result is low market penetration, disappointing market shares and poor profitability. The pursuit of billion-consumer markets requires that multinationals identify common factors that impact consumer behavior across emerging markets and design strategies for emerging markets as a group.

Meyer and Tran (2006) have suggested that a multi-tier strategy with local and/or global brands may provide MNEs with the widest reach into the market and the potential for market leadership. They have outlined the strategies for penetrating local markets through multi-tier branding and the acquisition of local firms, and offer new typologies that describe staged, multiple, indirect, or brownfield acquisitions.

Arnold and Quelch (1998) say that what most developed country companies would regard as basic infrastructure, is largely absent in emerging markets. Low-income markets are characterized by limited purchasing power, a lack of financial services, an inadequate institutional framework, and an insufficient market infrastructure. Moreover, the customer's lack of knowledge about products and services that exacerbate their diffusion, and missing intermediaries inhibit the acquisition of requisite market knowledge **(Gradl, Sobhani, Bootsman, &Gasnier, 2008; Kraemer &Belz, 2008; London, Anupindi, &Sheth, 2010; Rivera-Santos &Rufı´n, 2010).**

2.3. Operations in growing economies

Based on the internationalization process models **Tassilo, and Holtbrügge (2012)** argue that MNCs that have activities in the TOP-market of a specific country and possess specific knowledge will sooner/more likely enter the corresponding BOP-market and have successful operations there. The incommensurable knowledge base of MNCs hinders the autonomous development of knowledge about BOP-markets and makes them dependent on knowledge of other players **(Peng&Luo, 2000)**. MNCs have to establish embedded subsidiaries when they try to enter BOP-markets, as this form of market commitment allows them to get access to the knowledge of non-market partners.

K. E. Meyer et al. 2010) say that MNEs face growing challenges in managing the complexity of these interactions, because they must manage 'multiple embeddedness' across heterogeneous contexts at two levels. First, at the MNE level, they must organize their networks to exploit effectively both the differences and similarities of their multiple host locations. Second, at the subsidiary level, they must balance 'internal' embeddedness within the MNE network, with their 'external' embeddedness in the host milieu.

Within the international business literature, there is an appreciation that the writings of **Levitt, Ohmae, Fukuyama, and Friedman** may be a bit too simplistic. Instead, the international business literature has moved towards recognizing that global integration as relevant to MNE activity is about increasing interfaces between people, nations, and cultures that in most instances, continue to retain their local distinctiveness.

2.4. Strategy

As authors **Khanna, Palepu, and Sinha** recommend, first analyze each country's institutional context, including political and social systems; openness to foreign investment; and quality of product, labor, and capital markets. Then decide: Should you work around your target country's institutional weaknesses? Create new market infrastructures (for example, your own in-country supply chain)? Or stay away because adapting your business model would be impractical or uneconomical?

We compare and contrast business networks at the Base of the Pyramid (BOP) and at the Top of the Pyramid (TOP), and analyze their implications for multinational enterprises (MNEs). Our analysis suggests that major differences exist between both types of networks along all dimensions and that these differences have important implications for MNEs active in BOP environments.

2.5 Key Industry Challenges/Concerns for the Indian Chemical Industry

With immense potential lined up in the way ahead, it is of prime importance, to first overcome the existing challenges in the industry. The industry has several critical issues like infrastructure, scale of operation, access to technology, ease of doing business, energy and feedstock security etc. which have hampered it to achieve its true potential and if those issues are addressed with the help of Government intervention, it would help industry to achieve its true potential. The new Government is now focusing on to revive manufacturing, build robust infrastructure and regain investor's confidence. It has been taking initiatives to address challenges in feedstock availability, complex tax and duty structure and overcome other system intricacies.

a. Raw Material Issues

Lack of adequate raw material (feedstock)

Continuous availability of feedstock at competitive cost is a key concern for companies operating in this sector. Feedstock (naphtha and natural gas) are critical inputs for both organic and inorganic chemicals industry. Costs of these raw materials are high in India compared to countries like China, Middle East and other South East Asian countries such as Thailand and Indonesia. This makes the domestic products uncompetitive in the international market. In order to address this issue, the government has already taken some positive steps. Gas prices have been linked to international prices to bring in investment to explore and increase supplies. Further, the government is also exploring the possibility of setting up Reverse Special Economic Zones (SEZ) in various nations starting from Iran. In fact, steps are already under way to explore the feasibility of setting up a chemical plant in Iran and soon other countries such as Mozambique and Myanmarwould be also explored in this regard.

High dependence on imports for chemical needs

In last decade or so, the demand of petrochemicals has gone up substantially and this has led to increase in imports, as domestic output is lagging due to limited availability of feedstock like gas and oil. Given that the country lacks reserves of petroleum and gas but rich in coal, the industry has also not leveraged modern technology and new methods of exploration and production to use coal gasification as feedstock to produce chemicals and petrochemicals.

Volatility in raw material prices

More than 50% of global petrochemical capacities are based on naphtha, a crude oil derived product. The prices of crude oil products have witnessed significant volatility, thereby making petrochemicals prices highly volatile.

b. Infrastructural and Logistical Issues

Inadequate infrastructure facilities and power shortage

Due to the poor infrastructure facilities with in-adequate facilities at ports and railway depots and poor pipeline connectivity, domestic manufacturers face difficulties in obtaining raw materials from suppliers at competitive prices. Apart from this, intermittent power supply is

another issue which is affecting the energy intensive chemical industry and it is more pertinent to the small & medium players in the industry, who do not have the resources to invest in captive power plants like the large players. However, the government has taken some initiatives to address this issue. This includes proposal for building 7,900 km of highway projects and corporatization of public ports for improving their efficiency. Further, transparent auctions of coal blocks and spectrum have also helped the Cause

c. Logistical Issues

The Indian bulk chemical industry is mainly concentrated in the west coast especially Gujarat, due to proximity to raw materials and ports, while majority of the demand comes from the end-use industries located in the eastern and the southern regions of the country leading to distribution-related hurdles. This results in high transportation cost and raises the overall production cost, thereby making the imports cheaper compared to domestic purchase. For example- Soda ash manufacturers are located in Gujarat, whereas ~40% of the end use industries (glass, detergent and soap units) are located in south

Safe transportation of hazardous chemicals across the country is one of the biggest challenges **(SethiJasjit, 2014)**. A boom in the chemical industry has also led to an increase in the safety concerns of chemical logistics as freight traffic has increased sharply. An increase in the number of untrained staff to handle packaging and transportation of hazardous chemicals and lack of awareness about the new and emerging trends and technologies are some of the issues that challenge the transportation of hazardous chemicals in India.

d. Poor transportation infrastructure

India's roads haven't been able to keep up with the transportation demands of rapid urbanization. Poor quality of roads have Process flow of logistic industry increased accidents and also led to a loss in productivity due to delays. **(SethiJasjit, 2014)** Crossing check points: If a vehicle goes through numerous stoppages e.g. toll booths, greater the chance of it meeting with an accident as the contact with the human ecosystem increases. l Pilferage: Pilferage is a major concern. Costly chemicals are replaced by some other low value substance with truck drivers being the major culprits. As a consequence, raw material quality is compromised. l High level of fragmentation of the industry: A large share of the pie goes to small truck operators who bulk deliver non hazmat. These do not need handling precautions and are highly cost competitive as compared to the service providers with standards set for all types of carriage handling.

The latter suffers in this case **(SethiJasjit, 2014)** MSDS (Material Safety Data Sheet) not properly followed which results in various chemical disasters of warehouses resulting in huge losses in property and productivity. Poor storage Infrastructure: Most of the warehouses are not leak proof, ill-equipped with security systems, without adequate warehousing facilities. Lack of proper expertise in warehousing.

- Obstacles in using more intermodal transport.
- Increased competition amongst the service providers.
- Difficulties of obtaining permits for logistics infrastructure.
- Increase in transport costs, e.g. fuel and all other escalations.
- Increasing (local) restrictions on transportation of hazardous goods on certain parts of the transport infrastructure.

Poor availability of quality catalysts
It has been observed, that India lacks availability of good catalysts and processes for better processing and value addition to feedstocks. Lack of autonomous research centers are one of 30 Indian Chemical Industry: Challenges and Opportunities the primary reason. Government support, strengthening of resources and focused research in this field, especially by centers such as IIP and NCL, could help develop better catalysts.

2.6Competition

The manufacturers in this industry are subject to high level of competition. This leads to reduced prices, which could negatively affect the margins.

Availability of cheaper Imports
The chemical industry faces a major challenge in the availability of cheaper imported chemicals from low cost manufacturing hubs including China. After India's entry into the World Trade Organization, the government has been reducing the import tariffs on various products. Under various multilateral and bilateral agreements, India has committed to gradually eliminate the tariffs on various chemical products in addition to non-tariff import barriers such as quotas based on amount and source. Also, many of the chemicals are placed in Open General License (OGL) of imports. This has increased the import of various chemicals, intermediates and end products. However, the import duty tariff levels in India are still higher as compared to other chemical importing country. But, if the government decides to reduce the import tariffs further to meet increasing demand of the chemicals in the country, then the level of competition in the Indian chemical industry will further intensify

Large global capacity additions
Large capacity additions in countries such as ethane rich Middle East and shale gas rich USA is another cause of concern for the domestic players as it may affect their market. It is estimated, that out of the 30 million tons of ethylene capacity additions expected during period 2014 and 2018, 12.5 million tons is expected in the US alone. Since, ethane and shale gas based petrochemical products are cheaper than petrochemical products in India; it will affect the margins of the domestic players in the market.

High entry barriers
Given the capital intensive nature of the petrochemical plant and tariff barriers, new entrants and small and medium size companies are prohibited from easily entering into the market.

Low capacity utilization
Due to oversupply in global markets, the prices of petrochemicals have witnessed a steep decline, thereby forcing the domestic companies to underutilize their plants operating levels. The average capacity utilization has fallen from 95% levels before global economic crisis to 80% in 2013.

Growing circulation of counterfeit products
According to industry estimates, counterfeit pesticides account for up to 40% of the pesticides sold in India in FY13. These products are inferior formulations and do not show

the expected results. The damage through such products is multifold. Apart from crop loss and damage to soil fertility, use of non genuine products leads to loss of revenue to farmers, agrochemical companies and government. Some of the key reasons for use of non genuine products are lack of awareness amongst the farmers, difficulty in differentiating between genuine and non-genuine products, supply chain inefficiencies, law enforcement challenges and influencing power of distributors/retailers.

2.7. Regulatory Issues

Inverted duty structure discourages local manufacturing

The prevailing duty structure taxes raw materials (inputs) at a higher rate than the finished product, and thereby discourages domestic value addition through local manufacturing. In fact, some chemicals used in making medicines draw a duty of as high as 12 per cent, while free trade agreements (FTAs) ensure that the finished products draw negligible duty. In terms of finished goods, the domestic manufacturing industry has grown by 4 per cent in the last three years whereas the imports have grown by over 20 per cent for the same period. The government has taken few steps towards removing anomalies in the duty structures in this year's budget. In the union budget 2015, the government announced reduction in customs duty and special additional duty on certain raw materials used in manufacturing of chemicals. The government may further rationalize the duty structure to discourage low 32 Indian Chemical Industry: Challenges and Opportunities cost imports and facilitate better offtake from domestic markets. Further, the much awaited roll-out of GST in 2016 is expected to have a sizeable impact on the chemical industry by reducing logistical cost of companies as much as 20% and contribute to the overall growth of this sector

Complex regulations licenses

Up until recently, the sector was affected by too many and complex regulations and multiple licenses / certificates that were required to operate a plant in India. However, with the government's focus on improving the ease of doing business, several policy reforms have already been made including scrapping of industrial licensing for most sub-sectors except the ones dealing in hazardous chemicals.

Slow implementation of Petroleum, Chemicals and Petrochemical Investment Region policy (PCPIRs)

Though the PCIPR policy was notified in 2007, it has not witnessed significant offtake by the states till now. Only few states including Gujarat, Andhra Pradesh, Orissa and Tamil Nadu have so far evinced interested in developing PCIR regions in the state. Some states have also witnessed opposition by the farmers in land acquisition for developing PCIPR. However, the government is planning to revise the PCPIR policy to make it attractive for states to implement it and attract investment. Revisions are expected to make the policy more attractive and feasible for the states to execute. Other aspects such as financial support, clearances, additional anchor tenant and single window clearances were likely to be incorporated in the revised policy.

Drop in fiscal benefits

With India fast becoming a refining and petrochemical surplus nation, the government has withdrawn some of the income tax holidays and other fiscal benefits from the industry. Only

oil exploration companies now enjoy the benefits based on the profit-sharing mechanism with the government.

Long gestation period for new products

It takes significant time, almost up to 10 years to bring a new molecule into the market. Even for the generic products, it can take up to 5 years to get the product registered. The regulatory bodies do not have adequate resources and infrastructure to execute timely registration of products. Sometimes the rules are not clearly defined creating interpretation challenges for the regulatory bodies, leading to confusions thereby adding to the complexities for the crop protection chemical companies

2.8. R&D Related issues

Low focus on **R&D by domestic manufacturers due to high costs**

The industry is witnessing low R&D activity due to the high costs involved. It takes almost USD 250 million in research and development to introduce a new product in the market. This prevents the companies to invest in R&D activities and focus more on the generic products which require low investments in research and development.

2.9 Distribution and awareness related issues

Need for efficient distribution systems

The lack of robust distribution systems make it difficult for the agrochemical companies to reach the farmers to promote their products and educate them about their usage and benefits. At present, the industry is facing issues due to supply chain inefficiencies and inadequate infrastructure which results in post-harvest losses estimated at INR 45,000 crore every year, thereby impacting the farmers.

Lack of education and awareness among farmers

Lack of knowledge on the part of the farmers on the appropriate kind of pesticide, its dosage quantity and application frequency have hurt the demand for agro chemicals. This issue has been difficult to address due to poor reach of the farmers owing to infrastructure issues, regional languages and dialects. Furthermore, the retailer, who is the main point of contact between the manufacturer and the farmer often lack the technical experience and knowledge to provide correct advice to farmers.

2.10. Human Resource Related Issues

Shortage of skilled man power – Lack of skilled manpower is another issue faced by the industry. However, to address the industry's need of skilled manpower, the Ministry of Chemicals and Fertilizers recently signed three Memorandum of Understandings (MoUs) with the Ministry of Skill Development and Entrepreneurship. The MoUs aim to collectively address the incremental human requirement in the fertilizer, pharmaceutical and chemicals & petrochemical industry.

2.11 Environment protection related issues

Environment risk protection and pollution control measures entail significant expenditure

Environment protection issues are emerging as a great challenge for the Indian chemical industry. The operations of the company are subject to various government regulations including those pertaining to environmental protection. These laws and regulations stipulate higher environmental protection standards pertaining to air emissions, the use, handling and transport of hazardous or toxic materials, wastewater storage, treatment and discharges, waste disposal practices, as well as the remediation of environmental contamination. Complying with these regulations adds up new costs to the company, which could affect its operational performance. If the company fails to comply with these regulations, it may be penalized with hefty fines and penalties, which could have a material impact on the profitability of the company. The company may also be denied new projects, which might hamper its business prospects.

Key Opportunities for the Indian Chemical Industry

2.12 Product Portfolio Related

Enhance existing portfolio with advantaged products

Commodity chemicals companies can improve their product portfolio by adding specialty chemicals such as polymers additives, water treatment chemicals, lubricating additives, etc. or truly advantaged products. For example- The demand for performance plastics such as biodegradable polymers is expected to be on rise across the world including India. Given the environment concerns with traditional plastics, companies should look at expanding their portfolio and include more value add products. The advantaged portfolio will help improving their margins but will require significant R&D efforts.

Opportunities for local customization

Indian specialty chemical market is characterized by the opportunity for local customization. Many customers are willing to sacrifice on some of the product attributes for a lower product price. These offerings can also be expanded to other Asian markets.

Growth in generic products

During the period of 2014 - 2020 products worth USD 6.3 billion are expected to go off-patent. This will provide opportunities for the Indian generic product manufacturers to expand their market presence and grow organically.

2.13 Market Access/ Geography Related

Explore global frontiers

Given the capital intensive nature of the project and high costs associated in India, the domestic companies may also look outside for organic and inorganic opportunities. Many western companies are shifting their base to resource rich nations like Saudi Arabia, Qatar, Russia, etc. Indian organic chemical companies may also explore opportunities outside the country either through Greenfield or brownfield projects.

Opportunity to serve a large addressable market

India represents a large and fragmented end-user market. To be able to serve it efficiently and adequately, the companies have to start adopting a twin strategy – key account strategy for large customers and partnership with other companies to foster distribution and access across geographies. It will be critical growth driver to have a strong vendor base and partnership arrangements with cost effective local companies to achieve a leadership position. c. Export Opportunities: India's share in export of global chemicals is less than 2 per cent. This means there is significant export potential especially for pesticides, which have registered strong growth over the last few years. Globally, India is the thirteenth largest exporter of pesticides. Most of the exports are off-patent products. The major exports from India happen to Brazil, USA, France and Netherlands. The key growth drivers are India's capability in low cost manufacturing, availability of technically trained manpower, seasonal domestic demand, better price realization globally and strong presence in generic pesticide manufacturing.

Growth Opportunities in Emerging Markets

The chemical manufactures in India can expect to benefit from the strong growth expected in the emerging countries of Asia-Pacific, Africa and the Middle East. Although the economic crisis has dampened the growth of the chemicals industry in the recent past, it continues to grow at a positive rate compared to the developed countries of Europe and North America

2.14 Process/ Infrastructure Related

Opportunities in Backward and Forward integration

The domestic organic chemical players lack pricing flexibility on account of lack of opportunities for backward integration. However, with the new finds of natural gas reserves in the country, the manufacturers should be able to leverage stable pricing going forward. Similarly, petrochemical companies producing benzene and propylene can look for forward integration opportunity given the demand supply deficit in phenol market. An opportunity exists for companies with better access to natural gas supply to venture into the methanol market facing continuous supply deficit. For e.g. Reliance Industries Ltd. successfully backward integrated from refining and petrochemical company to oil and gas exploration. ONGC which is primarily an exploration company recently built a Greenfield petrochemical project (OMPL).

India as an R&D hub for specialty chemicals

Large MNCs have started tapping India's cost advantage by investing in production for exports and also moving some of their R&D work to India. There is a large untapped potential in this space.

Opportunity for setting up reverse SEZs

In order to meet the rising demand for inputs for the chemical industry, the Indian government can consider exploring the possibility of setting up SEZs in countries such as Mozambique, Iran and Myanmar. Besides securing inputs at competitive prices, the reverse SEZ would assure rapid investment in the downstream projects in India thereby creating large employment in the country. In fact, steps are already under way to explore the feasibility of setting up a chemical plant in Iran and soon other countries will be explored.

Improved feedstock supply

Domestic products are uncompetitive due to high costs of naphtha when compared with ethane based products from Middle East. One means to improve the competitiveness is through improved infrastructure and feedstock support -- as more natural gas becomes available in India, the domestic players are likely to shift from naphtha to cheaper natural gas thereby increasing their competitiveness in the market.

Opportunities in coal gasification

With abundant coal reserves, there is an opportunity to leverage gasification technology to increase production of chemicals and petrochemicals. In last decade or so, the demand of petrochemicals has gone up substantially leading to increased imports as the domestic output is lagging due to limited availability of feedstock

2.15. Others

Low consumption of pesticides in India

Per hectare consumption of pesticides in India is amongst the lowest in the world and currently stands at 0.6 kg/ha. On the other hand consumption in developed nations ranges from 5-7 kg/ha whereas at 13 kg/ha China is almost 20-30 times as compared to India. In order to increase yield and ensure food security, agrochemicals penetration in India is bound to go up.

Growth in herbicides and fungicides

Labor shortage and increased costs, along with growth in GM corps has spiked the use of herbicides. The herbicide consumption in India currently stands at 0.3 USD billion and is expected to grow at a CAGR of 15% over the next five years to reach 0.6 USD billion by FY18. On the other hand the fungicide industry in India has grown due to the growth in Indian horticulture industry, which has grown at a CAGR of 7.5% over the last five years.

Opportunity to emerge as a low cost outsourcing option in the global market:

There has been a noticeable global shift towards Asia as the world's chemical manufacturing hub. While China leads in this space, countries like Singapore, South Korea and Thailand have also quickly emerged as favorable low-cost sourcing destinations. By leveraging its ample labor force, available resources, and new technologies in alternative feedstock options- coal gasification, syngas and pet coke, even India can emerge as a low-cost outsourcing option in the global market.

2.16 Framework for a profitable and sustainable future

Even though the Indian chemical industry has witnessed robust growth in the past decade, the potential for future growth is significant. The per capita consumption of chemicals in India is much lower than the western countries – for a country of 1.25 billion the industry was valued only at USD 139 billion in FY 14. Despite its significant GDP contribution, the industry represents only around 3% of global chemicals industry.

In coming years, India is expected to rise as both, a manufacturing capital for valued goods and well as a consumer-driven economy from a broader perspective. The country will grow at 7.5 to 8 percent over the next 3-4 years. In this scenario, the Indian chemical industry is expected to grow at 9% every year to reach a market size of USD 214 billion by the end of FY 2019. The industry is likely to benefit from the improvement in investment climate, interest rate reduction, speedy approval of projects and proposed reform measures that would translate into higher industrial activity, and in turn higher demand for chemicals. Several factors such as rising demand for specialty chemicals and pharmaceuticals segment, low per capital consumption including agrochemicals, likely growth in demand from paints, textiles and diversified manufacturing base are expected to drive the growth in this sector.

Though the Indian chemical industry enjoys reasonable export presence, it lacks significantly behind its Asian counterparts. In order to be competitive at a global level, India will have to address the key issues pertaining to inadequate infrastructure and lack of availability of low-cost feedstock for production. The industry can leverage new technologies and explore alternative feedstock options such as coal gasification, syngas, and pet coke to mitigate the issue of feedstock availability in the sector. Post the formation of the new government at the center in 2014, the Indian chemical industry has received amuch needed boost.

The chemical sector has been included as priority sector under the ambitious ‘Make in India’ initiative of the government.‘Make in India’ is expected to play a pivotal role in driving some of the key initiatives to stimulate growth in the chemical industry. The government has already taken some
crucial steps to create favorable conditions, in terms of polices and infrastructure, to attract global and domestic investment in the Indian chemical industry.

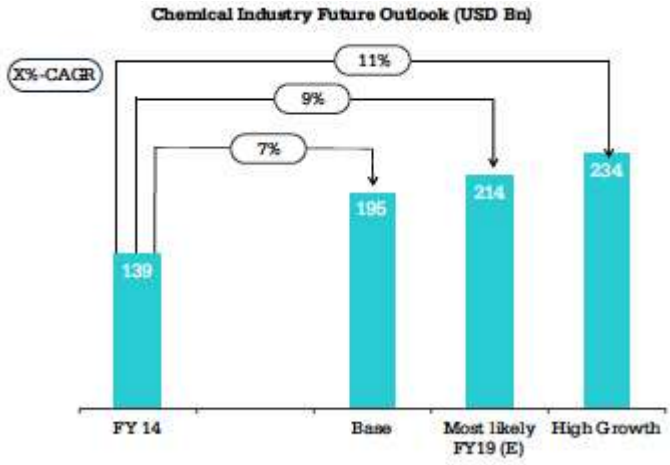
Make in India Campaign

One of the initiatives is 'Make in India' campaign, which aims to facilitate investment, foster innovation, enhance skill development and build best-in class manufacturing infrastructure. Under this initiative GOI is focusing on to raising the share of manufacturing in GDP from 16% to 25% by 2022.They have delicensed manufacturing for most of the chemicals and 100% FDI is made permissible in Indian Chemicals. Policies have been initiated to set up integrated Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR).It has also been encouraging the R&D sector and has reduced the list of reserved chemical items for production in small scale sector thus facilitating investment in technology up gradation and modernisation. Thus, through Make in India initiative, the government can ensure its domestic demand is efficacious and certain critical factors of the industry are well-

addressed, and competitiveness is enhanced for both domestic and multinational players as far as domestic manufacturing is concerned.

Besides the government support the key imperatives for the growth of chemical industry is to secure feedstock, right product mix and identify opportunities for Mergers and Acquisitions. Companies can secure feedstock by setting plants in the resource rich nation or explore alternative feedstock. Investments are needed to be made in the right product mix and optimize the use of available feedstock such as Naphtha and its derivatives. Exploring Merger, JV opportunities can help companies to gain capital and technology support and also might open new opportunities in the international market. To remain competitive in the market companies can invest in strategic energy management and strategic water management to cut down their energy costs and invest in upcoming PCPIRs in India and overcome challenges related to infrastructure, power and water availability.

To address the macro level uncertainties associated with an industry level growth estimate, Tata Strategic has developed three scenarios to look at the possible growth outlook of Indian chemical industry based on the growth rates of its sub-segments. In the base case, the market size is estimated at ~195 USD billion by FY19. Most likely the market will rise to ~USD 214 billion with 9% growth. And the optimistic case is likely to achieve a growth of ~11% p.a. over the next five years resulting in an industry size of ~USD 234 billion.



Section III: Need, Objectives, Hypothesis

3.1 Need for study

The current low per capita consumption (~10 Kgsfor polymers in India as compared to world average of 25Kgs) coupled with strong End use industry growth In India is expected to boost demand of the chemical products and thereby offers an opportunity for chemical companies to grow.

Globally sales of chemicals more than doubled over last decade, hitting a record US$ 5.2 trillion in 2013 (americanchemistry.com). Emerging economies drove large share of these gains, most notably in China where chemicals sales expanded at an average compound annual rate of 26% over that period. Growth in basic chemicals, which make up nearly two thirds of the industry, also benefited from the general uplift in oil and gas prices.

But at same time the chemicals industry is going thru a tremendous period of change that will help define opportunities and challenges in both the short and long term. Among these disruptions the nature and role of chemicals innovations has continued to move away from the blockbuster breakthrough that characterized the late 20th century and towards more incremental advances targeted at new solutions for particular problem. It is observed that increased commercialization of alternative manufacturing technologies such as converting coal to liquids and gas to liquids, manufacturing footprints have changed to take advantage of new shale gas supplies & finally new customers are emerging in a wider variety of regions and markets.

To succeed in this landscape, chemicals companies need to focus their strategic thinking on three areas (1) Adapting and refining their business models and manufacturing technologies (2) Identifying growth opportunities in emerging markets - which especially MNC will require a new mind set (3) harnessing the potential of digital technology to capitalize new wave of value creation**.**

It is observed that in spite of tremendous market growth in terms of volumes and revenues , margin quality for multinational Companies dealing in B2B chemicals is deteriorating in India

3.2 Objectives of research

- To study challenges of business for Multinational companies marketing polyurethanechemical in India
- To determine and study controllable market factors, impacting margin quality of polyurethanechemical companies
- To study various marketing strategies implemented by polyurethane industry for augmentation of growth and profitability
- To develop framework for marketing strategy for Multinational Companies engaged in Polyurethane Chemical business in India

3.3 Hypotheses

Null Hypothesis	Alternate Hypothesis
Ho 1. MNC chemical cos. with higher percentage of local (Indian) talent in top management have a higher market share	Ha 1. MNC chemical cos. with higher percentage of local (Indian) talent in top management may not have a higher market share
Ho 2: MNC chemical cos. which offer product differentiation are more profitable	Ha 2: MNC chemical cos. which offer product differentiation may not be more profitable
Ho 3: MNC chemical cos. which practice innovation in products and services are more profitable	Ha 3: MNC chemical cos. which practice innovation in products and services may not be more profitable
Ho 4: MNC chemical cos. which customize global products and services to local needs are more profitable	Ha 4: MNC chemical cos. which customize global products and services to local needs may not be more profitable
Ho 5: Investments by MNC chemical cos. in product safety drives higher profitability	Ha 5: Investments by MNC chemical cos. in product safety does not drive higher profitability
Ho 6: MNC chemical cos. with local manufacturing and distribution have a higher cost advantage	Ha 6: MNC chemical cos. with local manufacturing and distribution don't have a higher cost advantage

Strategic Leadership

Strategic Leadership is the ability of influencing others to voluntarily make decisions that enhance the prospects for the organization's long-term success while maintaining long-term financial stability. Different leadership approaches impact the vision and direction of growth and the potential success of an organization. To successfully deal with change, all executives need the skills and tools for both strategy formulation and implementation. Managing change and ambiguity requires strategic leaders who not only provide a sense of direction, but who can also build ownership and alignment within their workgroups to implement changes required and suitable to local business environment.

Customized Offerings

To successfully compete against local players, global chemicals companies need to invest in organic capabilities tailored to developing markets' varied characteristics. These include focusing on where to compete and avoiding a "one size fits all" approach; developing local sales and market support to ensure that customer preferences and requirements are captured appropriately and translated into market-specific product development; keeping manufacturing costs low enough to be competitive; and tailoring supply chains to balance agility and efficiency. Redesigned operating models must optimize both global and regional objectives and skills, leveraging the company's knowledge and experience obtained in developed markets while ensuring agility in adapting to local needs.

Innovative & Localized Model

Although markets and requirements for success have changed dramatically in recent years, many companies in the chemicals sector continue to falter under the weight of antiquated business models and go-to-market approaches. For some chemicals firms, the problem is manifested in overinvestments in specialty chemicals businesses that have offered differentiation and higher margins in the past but that are rapidly commoditizing. Other companies have been too myopic, cutting costs in specialty lines that would actually benefit from more nurturing, innovation, and focused investment. In some cases, chemicals companies have been late in recognizing the credible threat from lower-cost capacity built in Asia over the last decade, rendering themselves uncompetitive in these regions, often after they have installed costly assets in commoditized marketplaces. Frequently, these actions reinforce one another and companies end up in a death spiral, forced to close or divest businesses. Business model innovation depends on selling existing products to a variety of markets differently, while taking into account specific market realities in each region. By answering these questions, managers can shape and align the components of their business model to address the key components of their overall strategy: how the company's value proposition compares with competitive options in the marketplace; how changing revenue streams and market shifts will affect the company over the next one to three years; whether the company's cost structure is appropriate; which businesses require investment and which need pruning; what core capabilities, processes, and competencies are required to prosper in the market; and how the company can best align market demand, revenue streams, and cost structures to increase profitable growth.

India for global products, services and talent

Succeeding in emerging markets often requires a mind-set different from what Western companies are accustomed to. To innovate effectively, multinationals must understand the cost and product preferences not just of immediate customers, but of the entire downstream value chain. This requires local innovation and local resources — and the attraction, retention, and development of high-quality talent. Consequently, multinationals need to offer prospective local employees a compelling and attractive brand that can compete with domestic companies in work–life balance, global career paths, and meaningful leadership opportunities.

Local perceptions and regulations

Historically, the biggest risks faced by foreign investors were in developing countries with immature or volatile political systems. The chief concern is “expropriation risk,” the possibility that host governments would seize foreign-owned assets. Today, this risk has largely disappeared. Stronger international law and the symbiotic nature of growth in emerging and developed economies reduced asset seizures to nearly zero during the 1980s. However, as interest in emerging markets has soared, host countries have learned, according to George Chifor at the University of Windsor in Canada, “that more value can be extracted from foreign enterprises through the more subtle instrument of regulatory control rather than outright seizures.” The risk that a government will discriminatorily change the laws, regulations, or contracts governing an investment—or will fail to enforce them—in a way that reduces an investor’s financial returns is what we call “policy risk.”

Empowering local management

Empowering local management is also critical for attracting and retaining talented staff. Many multinationals are moving toward the creation of a strong Indian business unit and, in the process, moving away from functions or global products as the primary axis of governance. These companies are investing in top talent: the head of the Indian unit is experienced and knowledgeable about the market and has a direct line of communication with the global company’s CEO. This direct connection to global management—combined with the ability to make decisions on capital spending, products, and pricing—holds a local leader more accountable and facilitates the sharper development and execution of strategy.

Section IV: Overview of proposed study

4.1 Scope of study

To collect opinion and responses, the cities of north Central Region NCR (Delhi/Gurgaon), Gujarat (Vadodara/Ahmedabad) and Maharashtra (Mumbai) have been selected.Focused Industry : Multinational Chemical Companies in India dealing in Polyurethane Chemicals

4.2 Instruments of data collection

Primary Data: Online questionnaires and telephonic/personal interviews (both structured and unstructured) will be used for data collection

Secondary Data: Internet research, surveys, articles, government resources, libraries, journals and archives will be used to collect secondary data related to this topic.

4.3 Statistical tools and techniques

- Descriptive statistics, T-Test, F-Test, ANOVA, and other relevant statistical techniques will be used to analyze data using statistical computing softwares like MS Excel, R, SAS, Minitab.
- To check the internal consistency of questionnaire, Cronbach's alpha will be used. It is a measure of internal consistency, that is, how closely related a set of items are as a group.
- Statistical procedures like correlation and regression will be used to understand the relationships between variables which enable or inhibit Digital Business Transformation.

4.4 Sample Design

Malhotra, Naresh K in his book Marketing Research: An Applied Orientation, 6/E, has laid out guidelines for sampling process. The proposed thesis will follow the same as under:

4.4.1 Population

Mid and senior level managers from Chemical companies in India with at least 5 years of working experience in chemical companies (Bulk and Specialty Chemicals) having B2B model will be included in sample from the cities mentioned above along with representation from Experts/Consulting companies

4.4.2 Sampling Technique

Sample in this research (non-probability sample) will selected on the basis of their accessibility or by the purposive personal judgment of the researcher

4.4.3 Sample Size

Total size of the sample shall be approximately 301. The calculations are given below with a proposed breakup of sample.

4.4.4(a) Sample size for finite population

Calculation of sample size needed for study is as follows:

$$SS = \frac{Z^2 \times (p) \times (1-p)}{C^2}$$

$$\text{New SS(Finite)} = \frac{SS}{(1 + (SS - 1) / Pop)}$$

***Pop = Population**

SS = Sample Size
Z = Z-valueA (e.g., 1.96 for a 95 percent confidence level)
P = Percentage of population picking a choice, expressed as decimalB
C = Confidence interval, expressed as decimal (e.g., .04 = +/- 4 percentage points)
A Z-values (Cumulative Normal Probability Table) represent the probability that a sample will fall within a
certain distribution.
The Z-values for confidence levels are:
1.96 = 95 percent confidence level

SS = (3.8416 x .5 x .5) / 0.0025

= 384.16

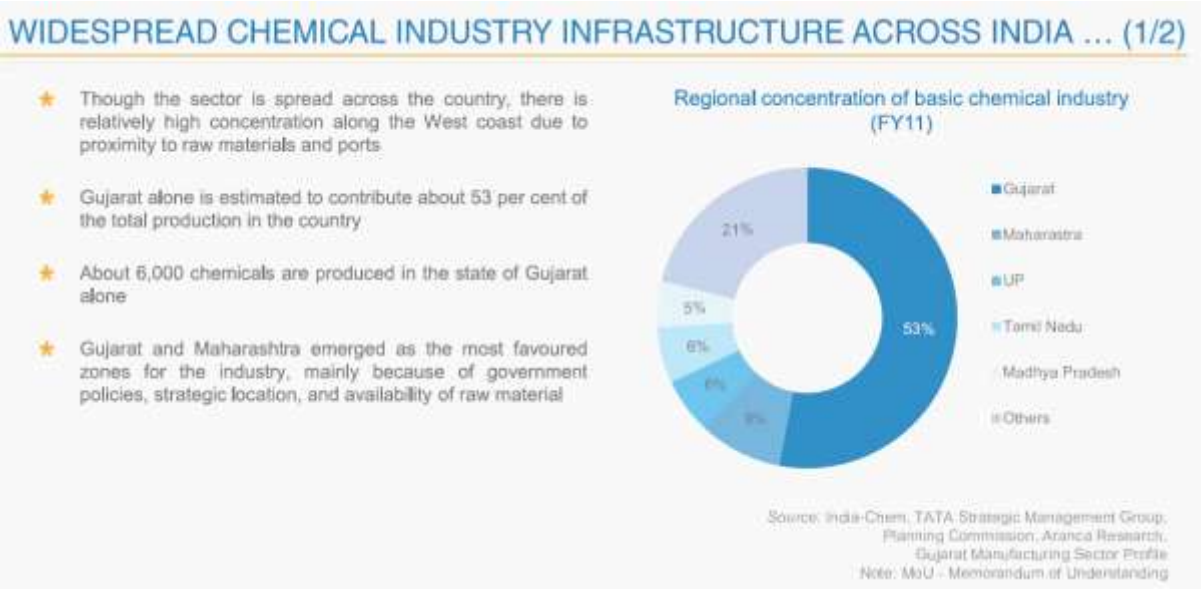
Finite Sample Size for Population Size of 1400
New SS = 384.16 / (1+ (384.16-1)/1400)

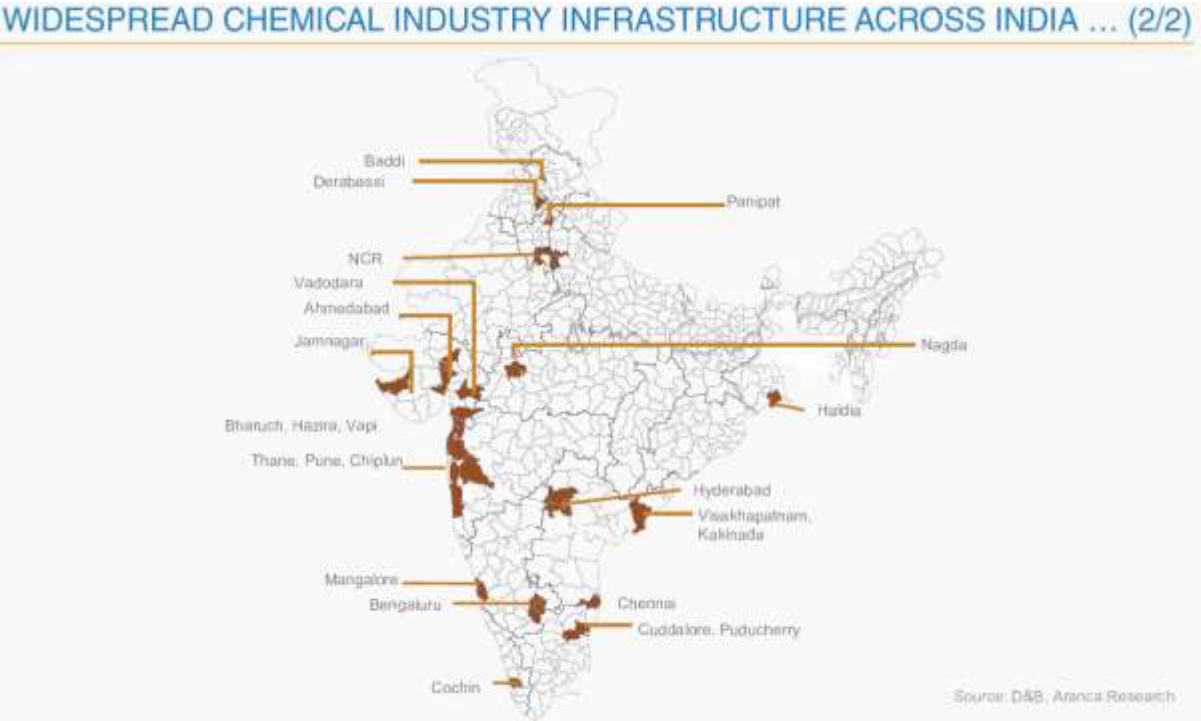
= 301

A tentative breakup of sample collection is as follows:

Category	NCR (Delhi/Gurgaon	Gujarat (Vadodara/Ahmedabad)	Maharashtra (Mumbai)	Total Sample
Chemical Industry Professionals	37	120	120	277
Consulting Professionals/Experts	8	8	8	24
Total	**45**	**128**	**128**	**301**

Geographical Spread of Chemical Companies In India


WIDESPREAD CHEMICAL INDUSTRY INFRASTRUCTURE ACROSS INDIA … (1/2)
Though the sector is spread across the country, there is relatively high concentration along the West coast due to proximity to raw materials and ports
Gujarat alone is estimated to contribute about 53 per cent of the total production in the country
About 6,000 chemicals are produced in the state of Gujarat alone
Gujarat and Maharashtra emerged as the most favoured zones for the industry, mainly because of government policies, strategic location, and availability of raw material
Regional concentration of basic chemical industry (FY11)
53%
21%
5%
6%
6%
9%
Gujarat
Maharastra
UP
Tamil Nadu
Madhya Pradesh
Others
Source: India-Chem, TATA Strategic Management Group, Planning Commission, Aranca Research, Gujarat Manufacturing Sector Profile
Note: MoU - Memorandum of Understanding



Section V: Chapterization

The proposed thesis will contain the following chapters:

Chapter 1 – Introduction

Chapter 2 – Review of Literature
Chapter 3 – Challenges, Opportunities
Chapter 4 – Research Methodology
Chapter 5 – Data Analysis
Chapter 6 – Results and Interpretations
Chapter 7 – MNC operations in growing economies
Chapter 8 – Strategic framework
Chapter 9 – Future prospects and limitations of research
Chapter 10 – References

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